New RTCM Standard on Real Time GNSS Data Dissemination over the Internet

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The Past

- Streaming Differential GPS corrections over Internet and cellular phone networks is feasible
- No significant lack of performance compared to usage of other transportation media

Open issues:

- Security
- User Accounting and Logging
- Session handling
- Workload on the server by multiple users

➢ Generating a Standard

The Future: RTCM - SC104 & Ntrip

- Working since Jan 2003 on Internet based GNSS data dissemination standard
- WG „Internet Protocol“
  Robert Snow (Thales) / Georg Weber (BKG)
- RTCM now voted for “Ntrip, Version 1.0”

Ntrip

Networked Transport of RTCM via Internet Protocol

- Based on internet radio technology
- Open documentation
- Http compatible
- Using one port for all data streams
- Http port 80 supported by Firewalls and Proxy server
- Usable for various kinds of GNSS data
  e.g. RTCM / CMR / RAW

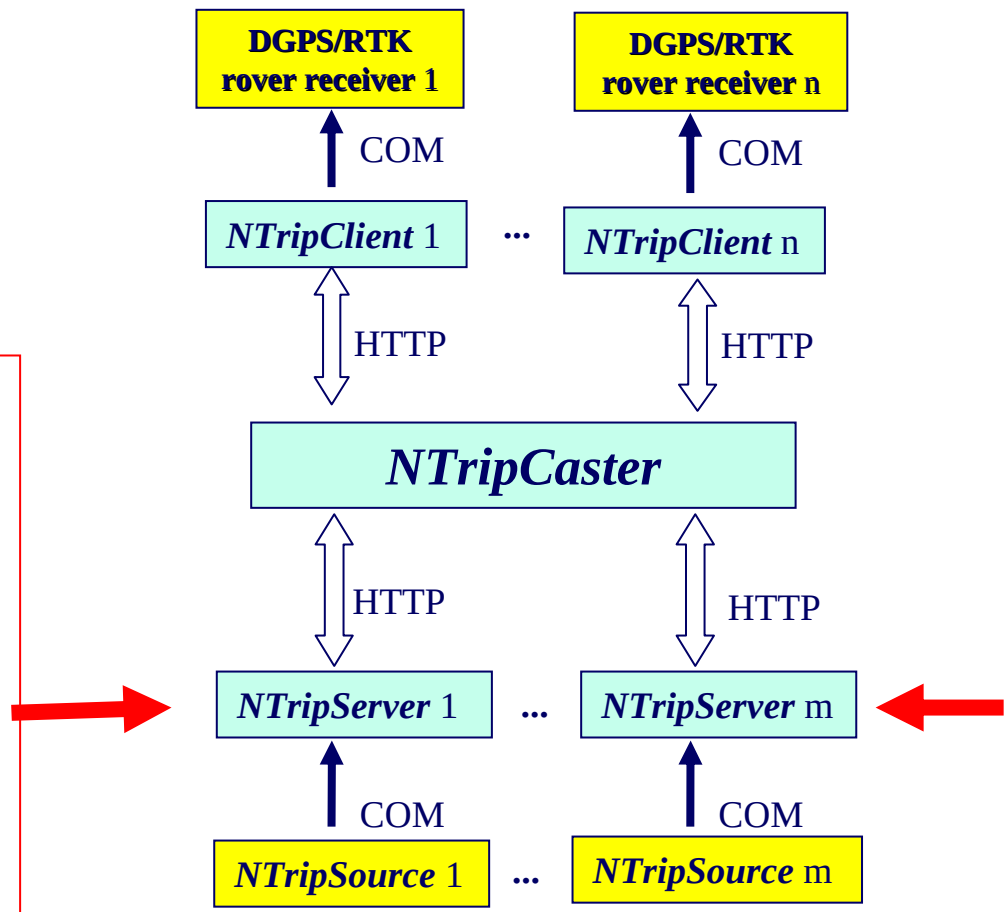
Ntrip Motivaiton

- **Real-time GIS needs wireless Internet access anyway**
  - Users request real-time GNSS data over the same communication channel
  - Getting rid of an extra GPS radio

- **Lots of resources in place, e.g. CORS/PBO & Postprocessing: Why deliver a daily newspaper monthly?**

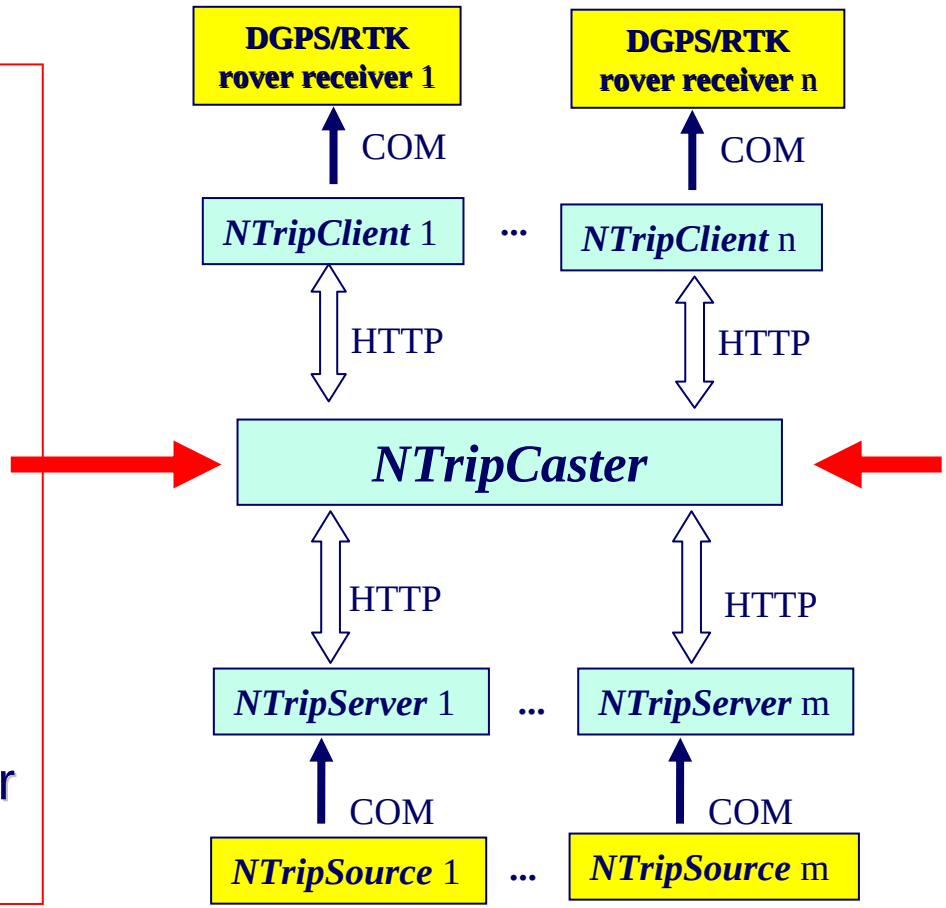
Ntrip Server

- NtripServer receives data of NtripSource and forwards it to NtripCaster
- Mountpoint and password are defined by administrator of NtripCaster for purpose of authentication
- You can send any data format.



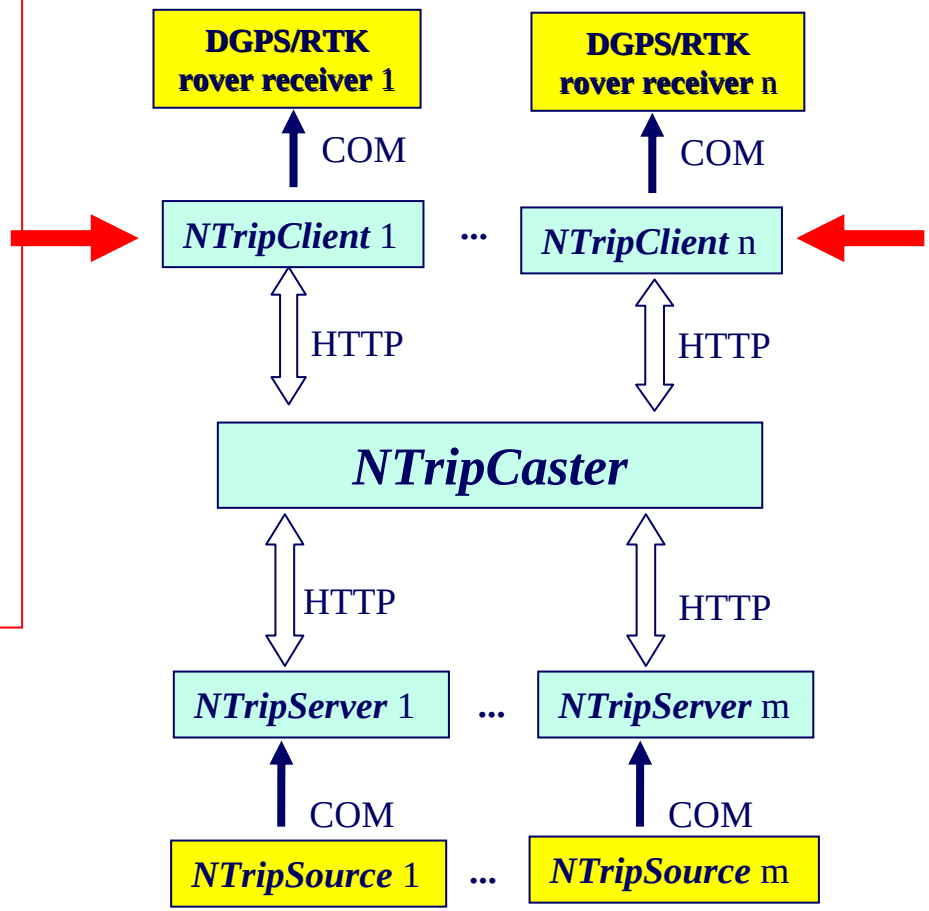
Ntrip Caster

- Is the component for stream splitting and broadcasting
- Acts as ”switch board” for connecting NtripClients to required streams
- Each data stream is listed in a ”Source Table”
- Provider for additional information on other Caster and the Network providers

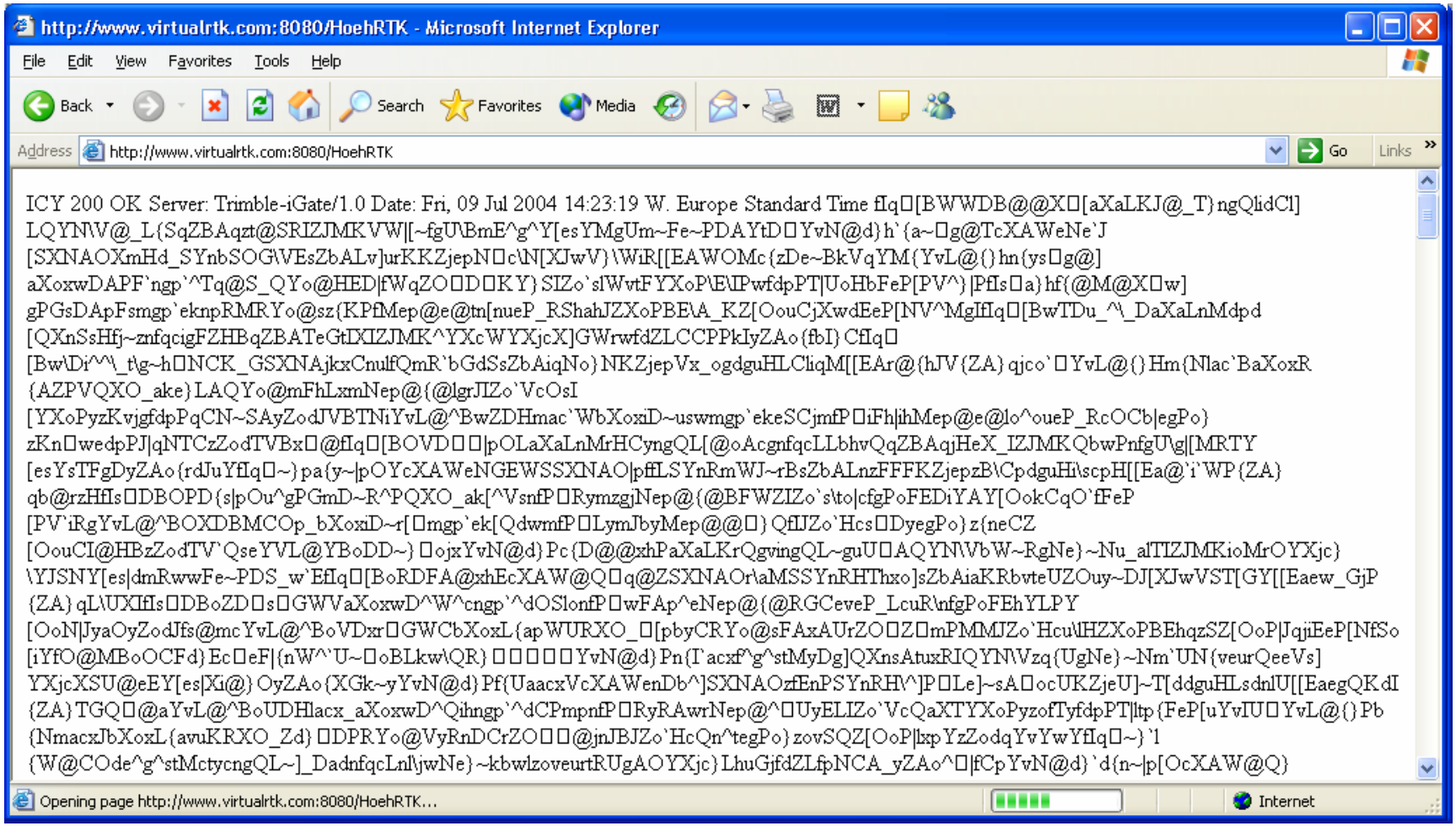


Ntrip Client

- Sends and receives data to and from NtripCaster.
- May retrieve list of available NtripSources and allow selection of source stream
- Forwards data either to rover RTK GPS receiver or to processing software in an application terminal for calculating position



Using Http


http://www.virtualrtk.com:8080/HoehRTK - Microsoft Internet Explorer
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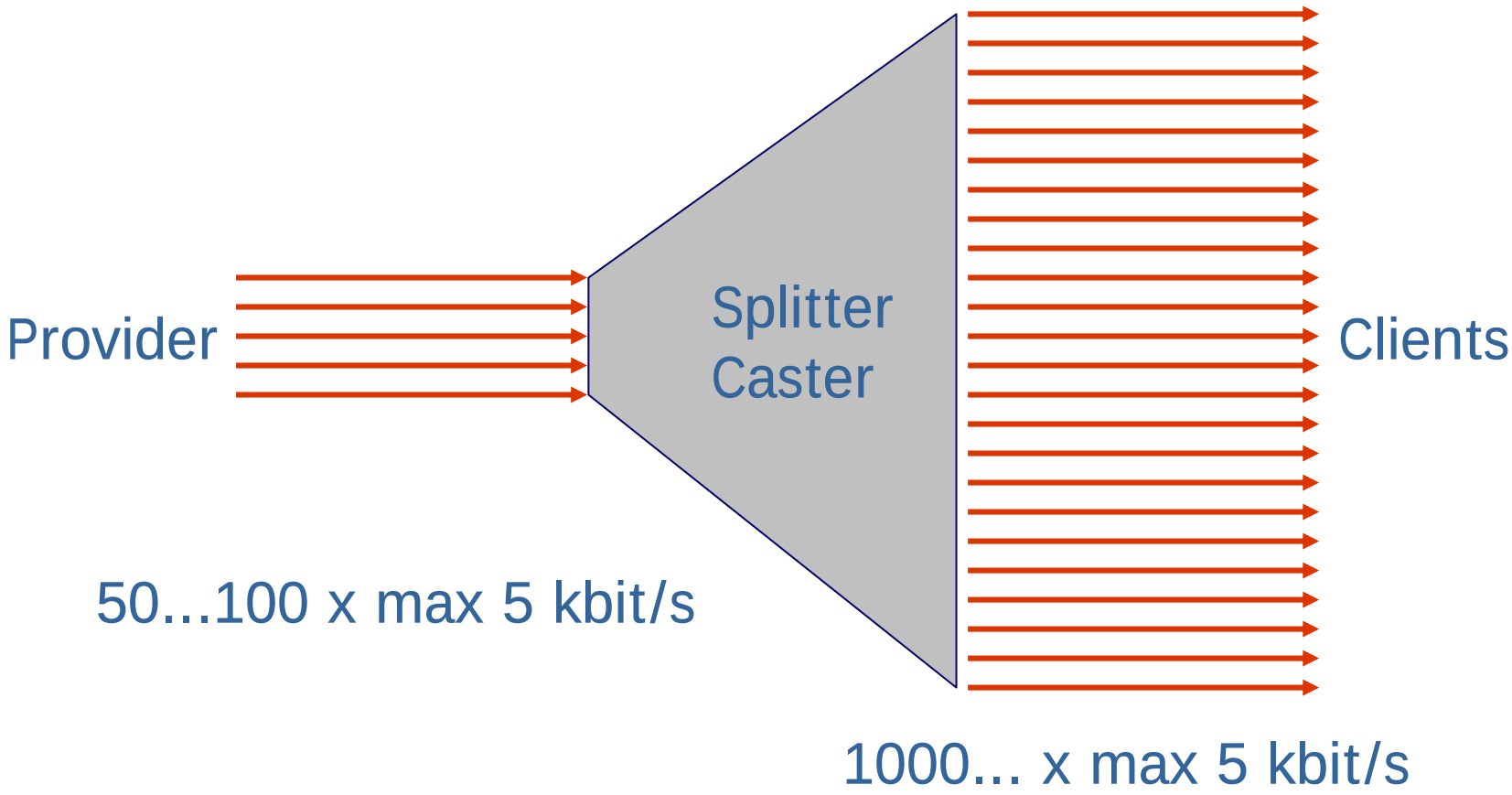
ICY 200 OK Server: Trimble-iGate/1.0 Date: Fri, 09 Jul 2004 14:23:19 W. Europe Standard Time
Opening page http://www.virtualrtk.com:8080/HoehRTK...
Internet

Ntrip Facts

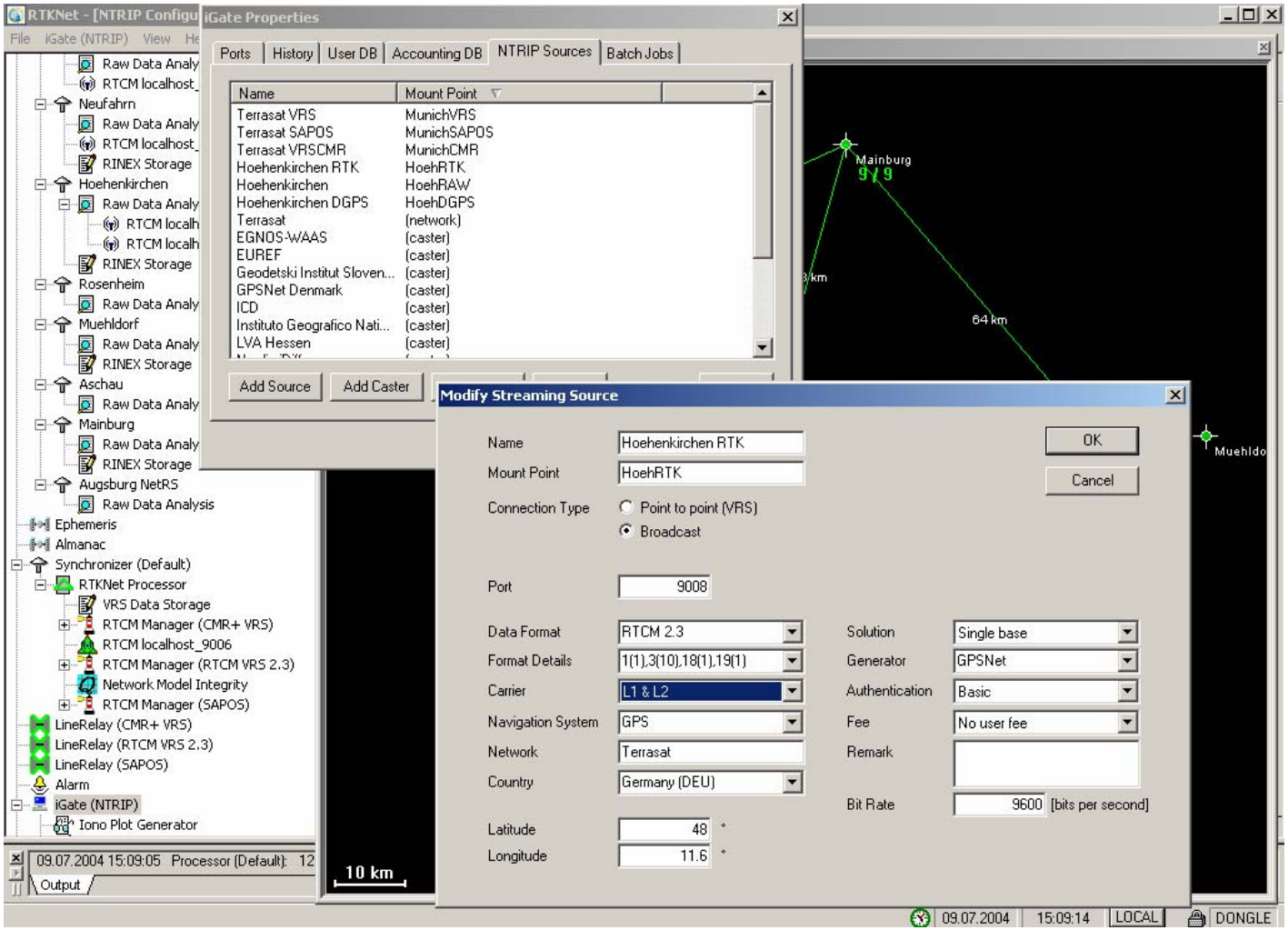
- End of dedicated hardware for receiving RTCM
- Major parts of the BKG implementation is available under „GNU General Public Licence“
- No GSM, no access server required
- Internal usage in support of networking DGPS/RTK infrastructure
- Supporting all future wireless Internet transport media like GPRS, UMTS or WLAN

Ntrip broadcast

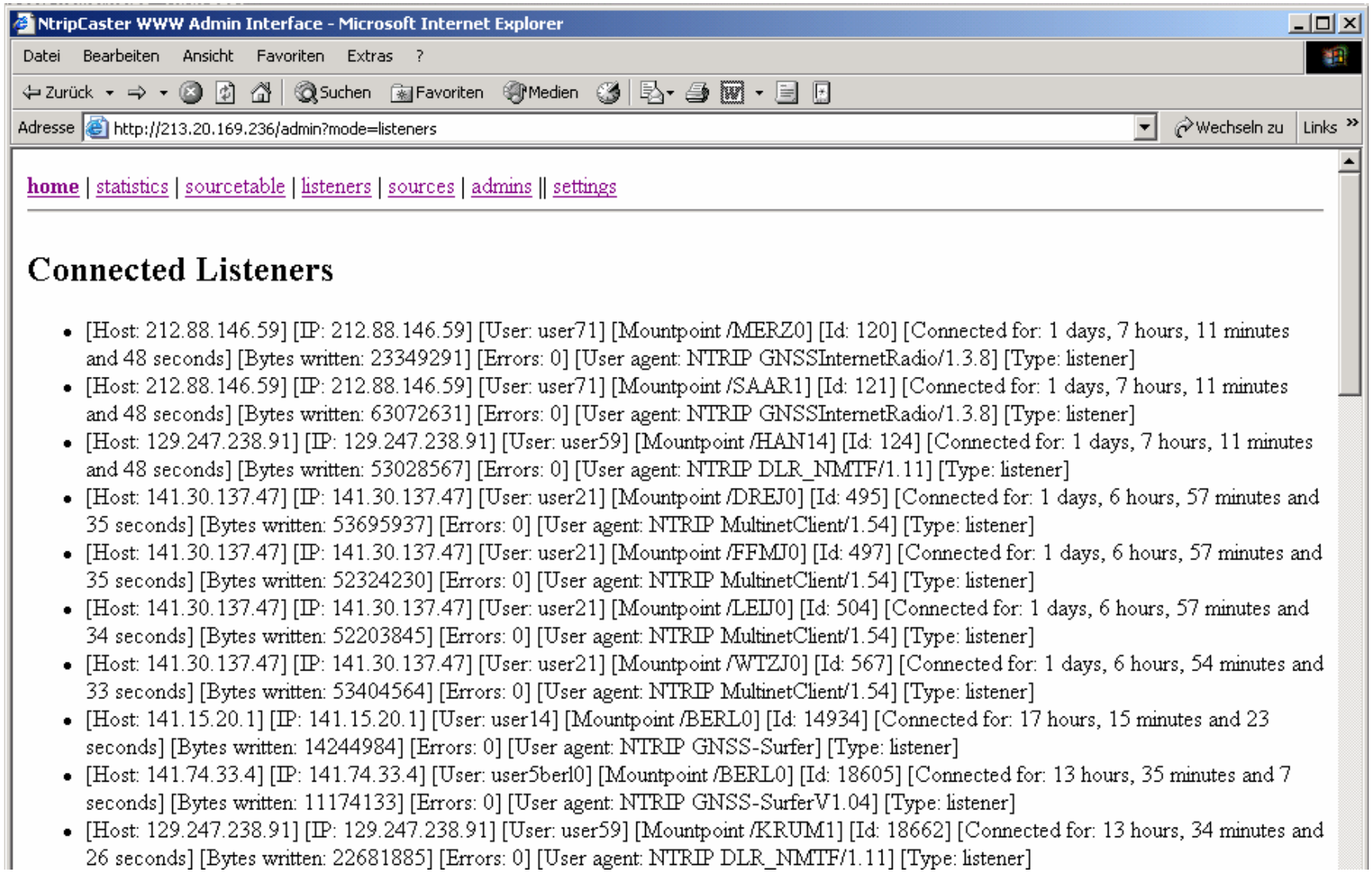


Caster implementations: Trimble, Geo++, BKG

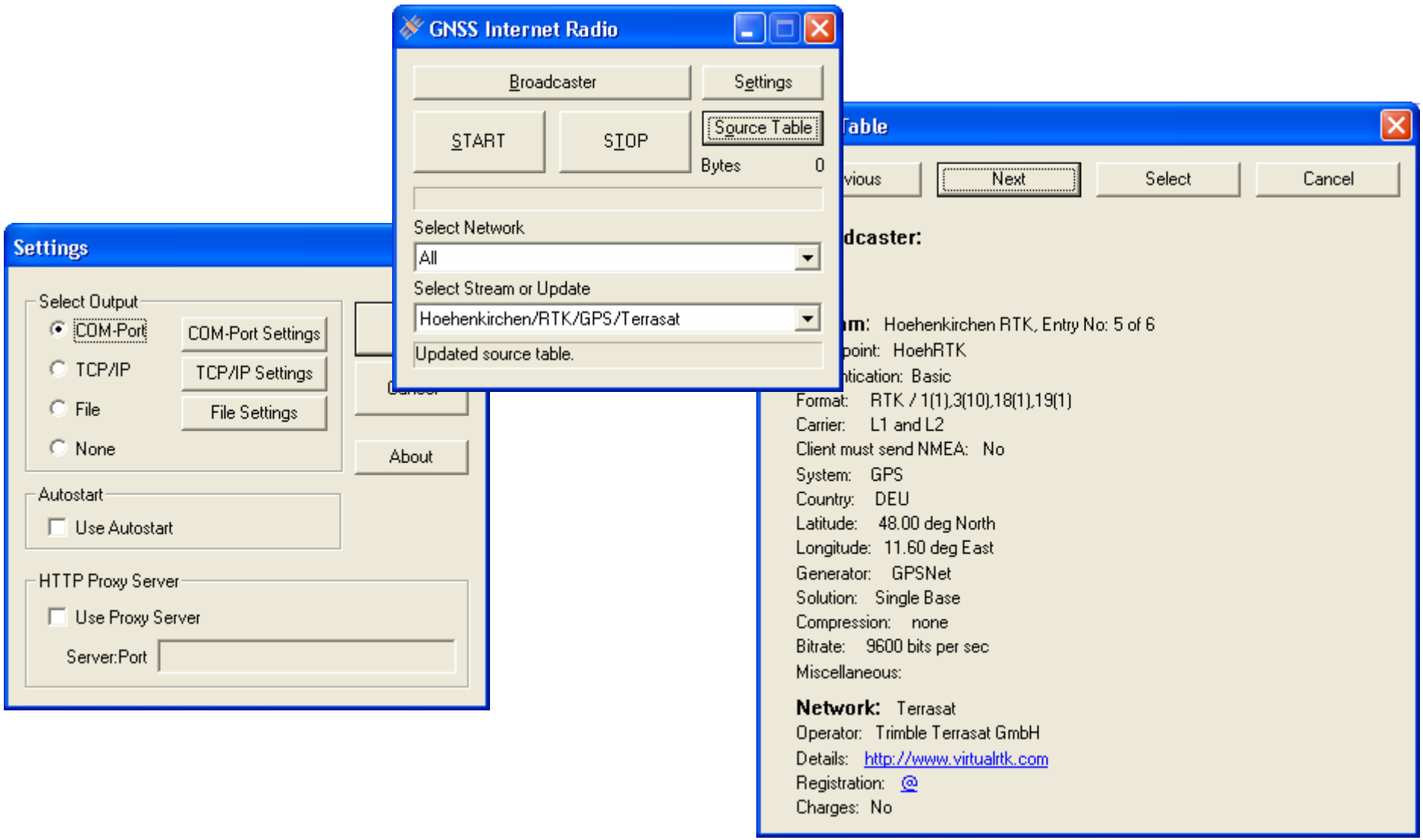
Here: Trimble



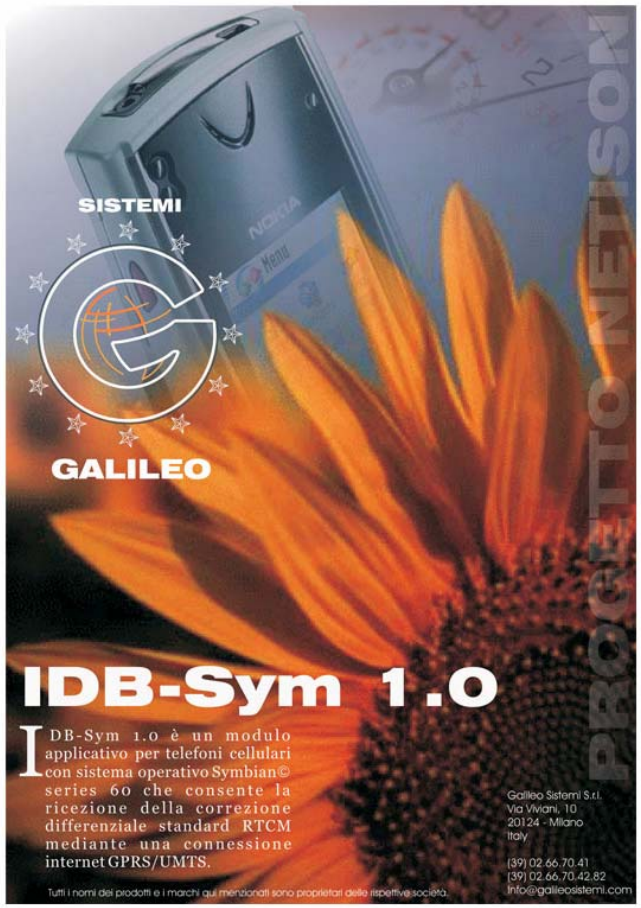
Caster implementation: Here BKG



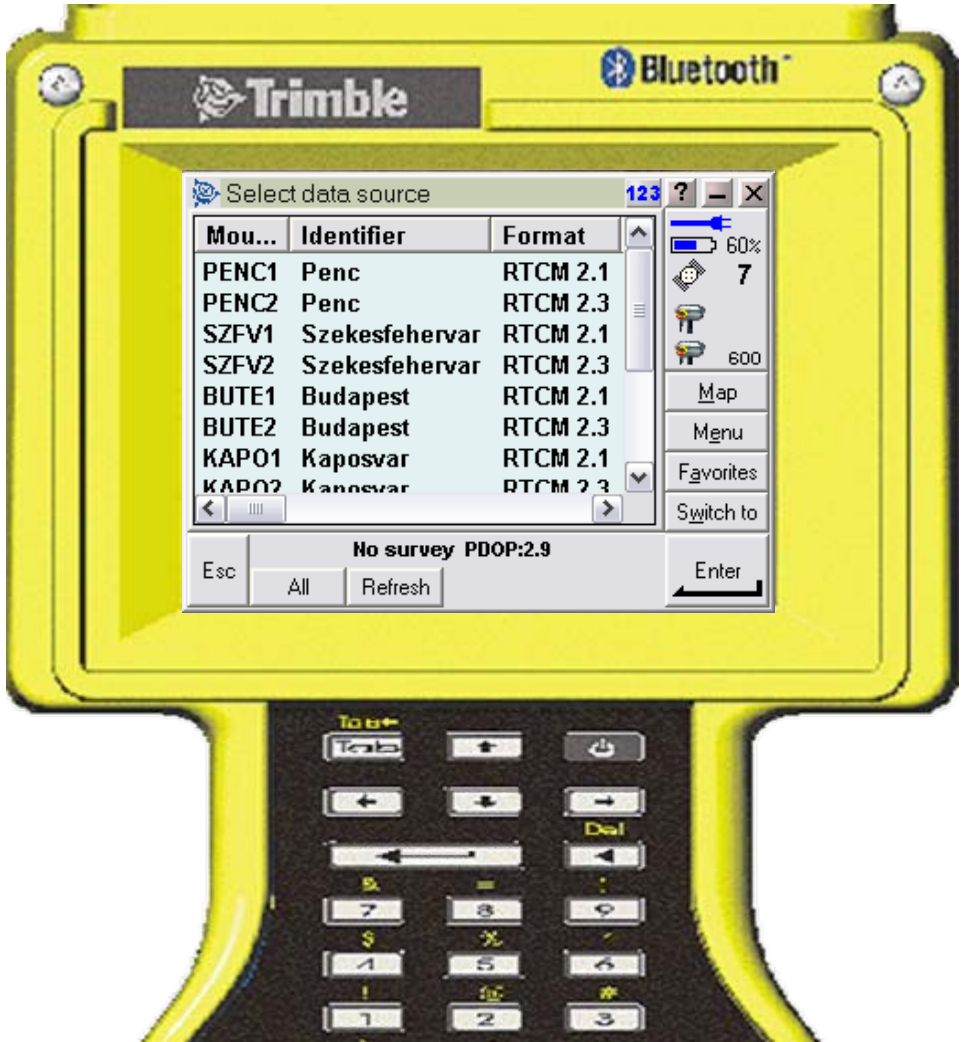
EUREF-IP Client



IDB-Symbeni 1.0



Trimble Client

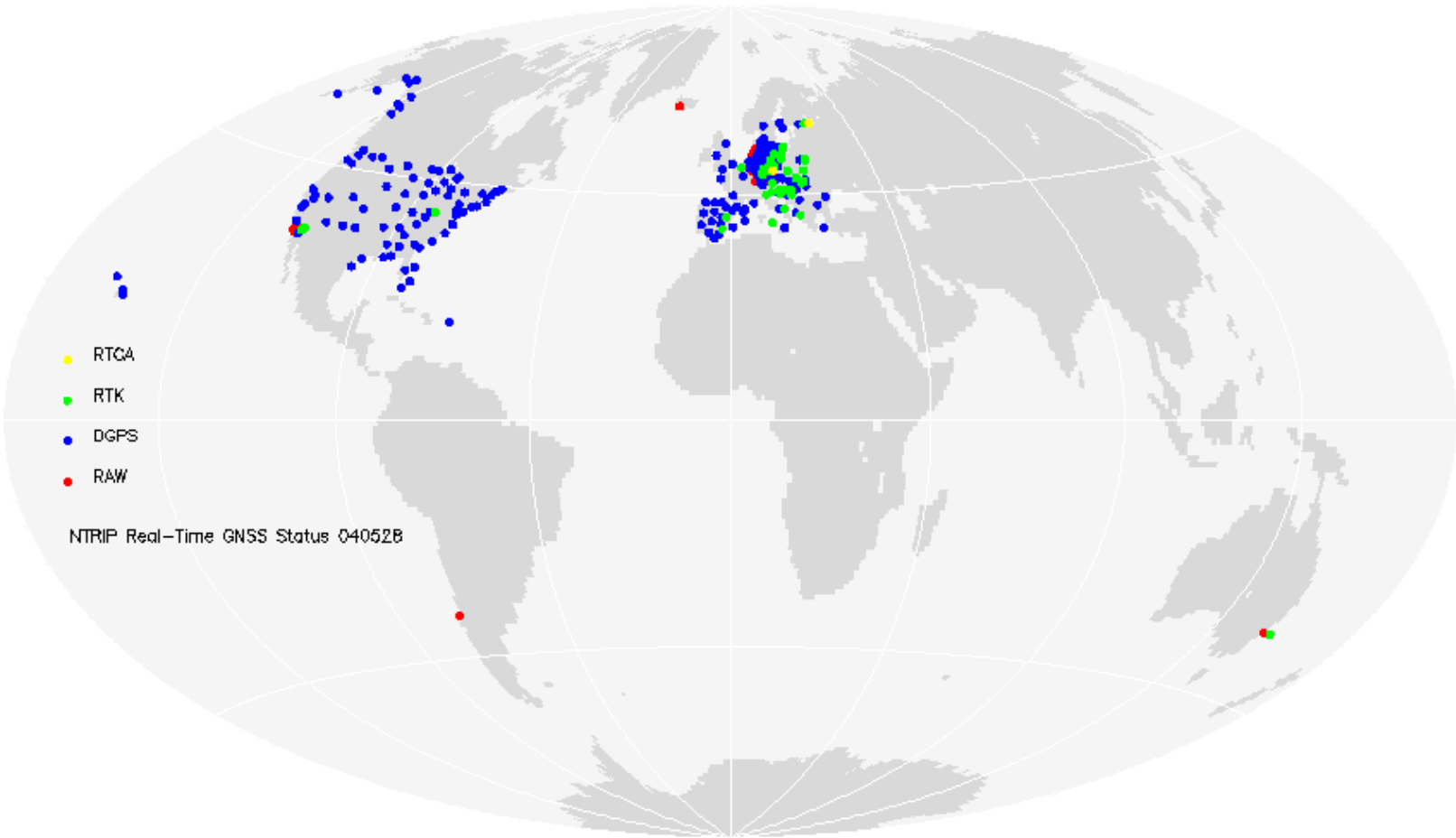


Commercial Hard and Software Supporting NTRIP

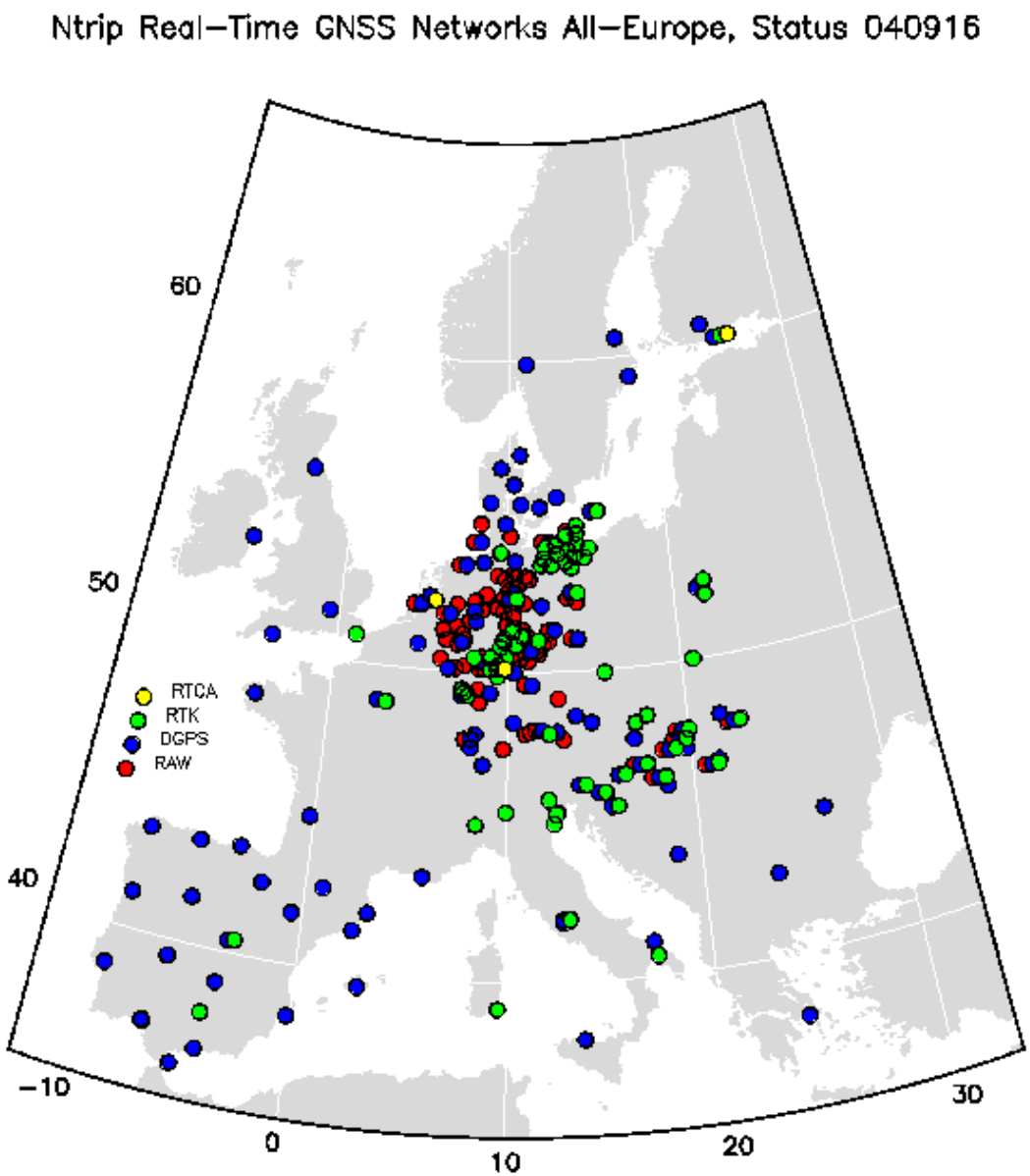
ArcNtrip ArcPad GIS Data Collection Software, NtripClient
EuroNet DGPS Network Processing Software, NtripClient&Server
EuroRef Reference Station Software, NtripClient
GART-2000 Rover Control & GIS Data Collection Software, NtripClient
GNCASTER Ntrip Broadcaster Software, NtripCaster
GNSMART DGPS & RTK Networking Software, NtripClient&Server
GPSBase Reference Station Software, NtripServer
GPSNet DGPS & RTK Networking Software, NtripCaster
PocketGPSLib MS Visual C# .NET GpsLibrary for PocketPC, NtripClient
SurveyController Rover Control Software, NtripClient
TerraSync GIS Data Collection & Data Maintenance SW, NtripClient

Status Sept 2004

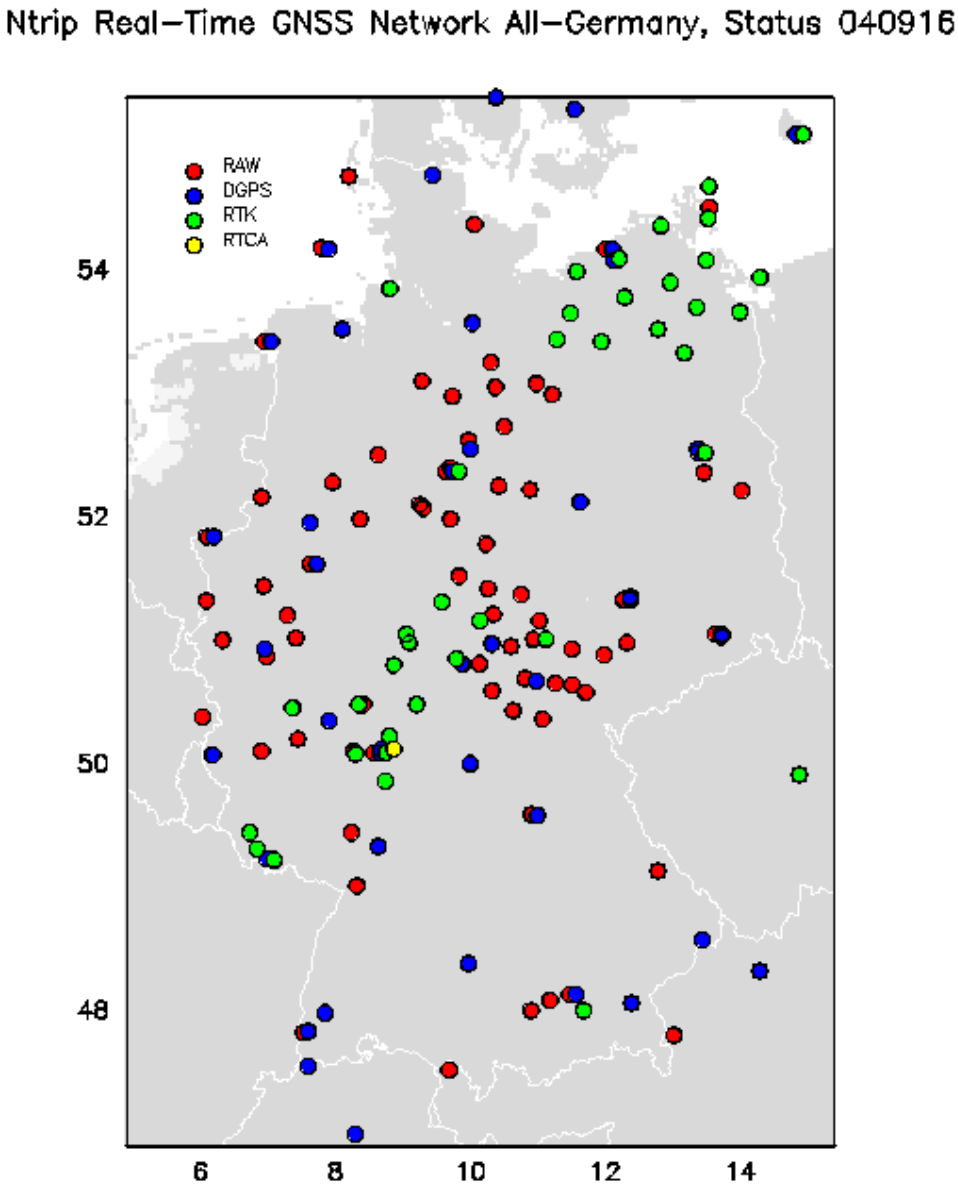
Ntrip Status: Streams, Worldwide



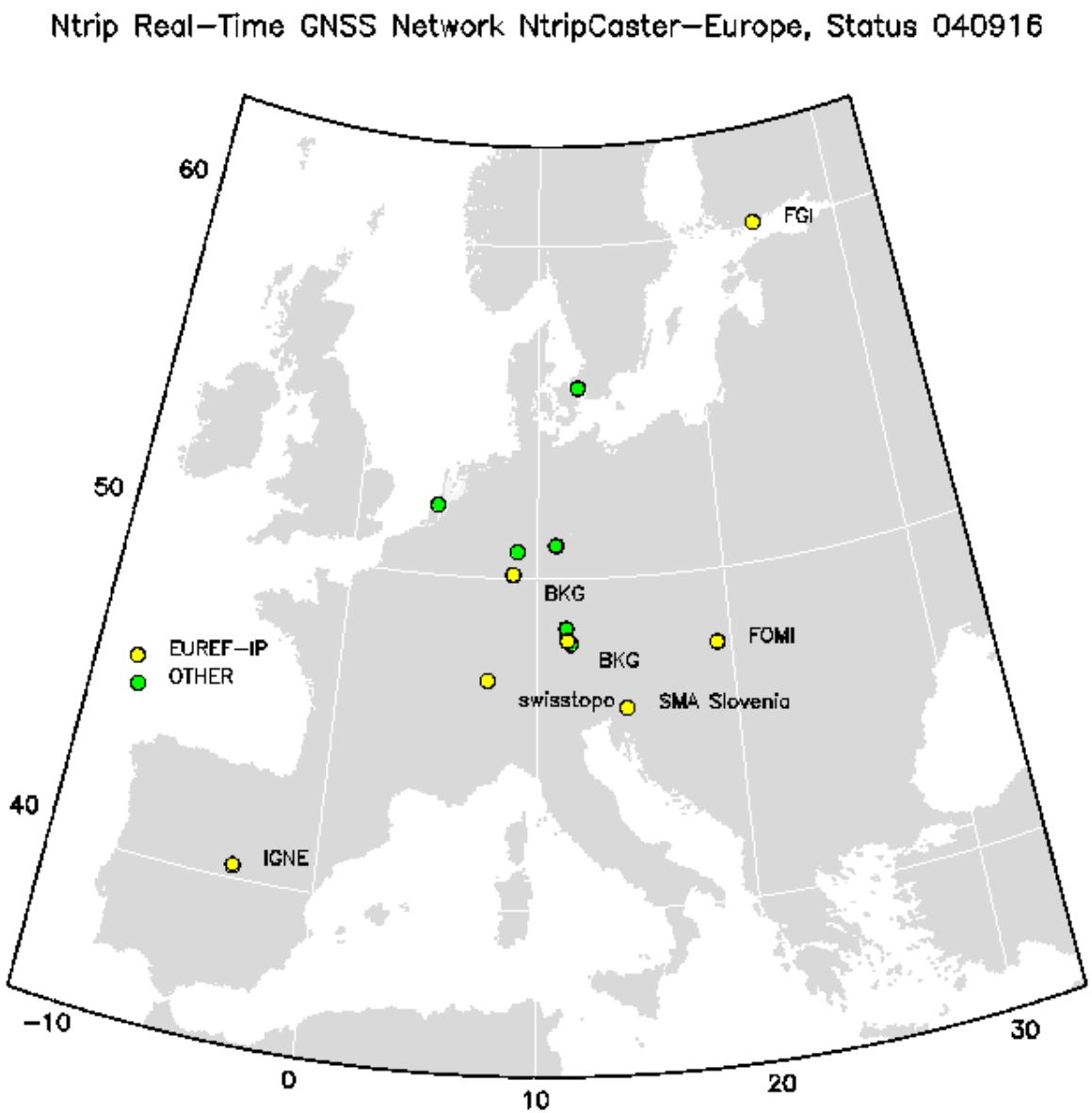
Ntrip Status: Streams, Europe



Ntrip Status: Streams, Germany



Ntrip Status: Provider, Europe



Summary

- Streaming Differential GPS corrections over Internet and cellular phone networks has proofed working
- RTCM committee accepted Ntrip as standard for packet based communication
- Various Ntrip clients are available and easy to develop.
- Multiple services already established
- Commercial SW available and under developement

Questions ?

http://igs.ifag.de/index_ntrip.htm